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EXAMINER	
ROSARIO, DENNIS	

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2621	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/058,727	JABRI ET AL.	
	Examiner	Art Unit	
	Dennis Rosario	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *amt. 6/27/2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment

1. The amendment was received on June 27, 2005. Claims 1-55 are pending.

Response to Arguments

2. Regarding claims 1,15,26 and 36, Applicant's arguments on page 14, last paragraph, filed 6/27/2005 have been fully considered but they are not persuasive and states in pertinent part:

> The Zhao et al. reference fails to disclose..."automatically providing a soft tissue decomposition parameter and a bone decomposition parameter by *modifying the default decomposition parameter based on the patient size and filtration setting"* (emphasis added).

However, the Zhao et al. reference does disclose automatically providing a soft tissue decomposition parameter and a bone decomposition parameter (Fig. 3 is a flow chart for a computer, which inherently performs the operations of fig. 3 as opposed to a person performing the operation of fig. 3, that provides "Φ_s and Φ_b [which] are...angles to obtain in fig. 3, num. 330, respectively, a soft tissue image and a bone...image (col. 9, lines 16-18)." Note that Φ_s and Φ_b are also "parameters Φ" in col. 6, line 42 for soft tissue and bone, respectively.) by modifying the default decomposition parameter (Fig. 3 is a flow chart for a computer, which inherently performs the operations of fig. 3, that provides "Φ_s and Φ_b [which] are...angles [or parameters] to obtain in fig. 3, num. 330, respectively, a soft tissue image and a bone...image (col. 9, lines 16-18)" by modifying

the default decomposition parameter, "adjustable Φ parameters" in col. 6, line 42. Note that Φ regardless of the subscript is used during decomposition as shown in fig. 3, numerals 320: "B: Material Decomposition"; thus Φ is a decomposition parameter.) based on the patient size (Fig. 3 is a flow chart for a computer, which inherently performs the operations of fig. 3, that provides "Φ_s and Φ_b [which] are...angles [or parameters] to obtain in fig. 3, num. 330, respectively, a soft tissue image and a bone...image (col. 9, lines 16-18)" by modifying the default decomposition parameter, "adjustable Φ parameters" in col. 6, line 42, based on patient size or "thickness" in fig. 3, num. 328.) and filtration setting (Fig. 3 is a flow chart for a computer, which inherently performs the operations of fig. 3, that provides "Φ_s and Φ_b [which] are...angles [or parameters] to obtain in fig. 3,num. 330, respectively, a soft tissue image and a bone...image (col. 9, lines 16-18)" by modifying the default decomposition parameter, "adjustable Φ parameters" in col. 6, line 42, based on patient size or "thickness" in fig. 3, num. 328 and filtration setting as performed in fig. 3, num. 300 and mentioned in the context "filters" in col. 7, line 10 and how the filters are set to "switch[ ]" in col. 7, line 11 to arrive at the above mentioned angles or "predefined...angles [or parameters, Φ_s and Φ_b] (col. 9, line 16).").

3. Regarding claims 5,19 and 30, applicant's arguments on page 16, 2nd paragraph filed 6/27/2005 have been fully considered but they are not persuasive and states in pertinent part:

> Zhao et al...fails to teach "selecting a filtration offset factor *based on a filtration setting*."

However, Zhao et al. does teach the above limitation addressed below in claim 30.

4. Regarding claims 9,22 and 32, Applicant's arguments on page 16, 2nd paragraph, filed 6/27/2005 have been fully considered but they are not persuasive and states in pertinent part:

> Zhao et al....fails to teach *modifying* a parameter, much less modifying a default based on the modification to the parameter. Further, the Zhao et al. reference certainly does not disclose *interactive* modification.

However, Zhao et al. does teach as claimed:

a) modifying at least one parameter (The variable "Φ" in equations 8 and 9 are modified during "rotation in a material base" in col. 9, line 6.) of the soft tissue and bone decomposition parameters (The variable "Φ" in equations 8 and 9 are modified during "rotation in a material base" in col. 9, line 6 of the soft tissue and bone decomposition parameters, Φ_s and Φ_b, respectively.) to improve image clarity of at least one image of the soft tissue and bone images (The variable "Φ" in equations 8 and 9 are modified during "rotation in a material base" in col. 9, line 6 of the soft tissue and bone decomposition parameters, Φ_s and Φ_b, respectively, to improve image clarity of at least one image of the soft tissue or "soft tissue" in col. 6, line 51 and col. 9, line 18 that appears when a "background...disappear[s] (col. 6, lines 49,50).") interactively (The variable "Φ" in equations 8 and 9 are modified during "rotation in a material base" in col. 9, line 6 of the soft tissue and bone decomposition parameters, Φ_s and Φ_b, respectively, to improve image clarity of at least one image of the soft tissue or "soft tissue" in col. 6, line 51 and col. 9, line 18 that appears when a "background...disappear[s] (col. 6, lines 49,50)" interactively since the soft tissue is "desired" in col. 6, line 50 and is inherently "observed" in col. 6, line 49 where the words desired and observed are interpreted in the context of a user.); and

b) automatically modifying at least one system default (The function $A_i(\Phi)$ in column 6, equation (5) is a system default because it corresponds to an "obtain[ing]" in col. 6, line 44 operation where one image or current image is considered the default when a new image is not obtained and the current image is automatically modified based on Φ to obtain a new image.) based on modifications to the at least one parameter (The function $A_i(\Phi)$ is a system default because it corresponds to an "obtain[ing]" in col. 6, line 44 operation where one image is considered the default when a new image is not obtained and is automatically modified based on modifications to the at least one parameter, Φ where Φ is rotated to either Φ_s and Φ_b in the above mentioned material base which is a 2-D vector space where a vector is rotated at predetermined angles.).

Argument similar to that presented above for claims 5,19 and 30 is equally applicable to claim 46.

Argument similar to that presented above for claims 1,15,26 and 36 is equally applicable to claim 48.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-55 are rejected under 35 U.S.C. 102(b) as being anticipated by Zhao et al. (US Patent 6,683,934 A).

Regarding claim 26, Zhao et al. discloses a method of producing soft tissue and bone images of the desired anatomy of a patient, comprising:

a) means (Fig. 3. num. 300: "1:Obtain dual images at high and low energies" is part of a program in col. 8, lines 44,45 and 46.) for acquiring low and high-energy images (Fig. 3. num. 300: "1:Obtain dual images at high and low energies.") of the desired anatomy (Fig. 1, num. 50: Subject for Imaging) from a digital radiography imaging system (Fig. 1 is a system) using flat-panel detector technology (fig. 1,num. 30: Pixelated Digital x-ray detector);

b) identifying a patient size of the patient ("patient size" in col. 3, line 49, col. 4, lines 65,66 and "size of the object" in col. 5, line 8);

c) identifying a filtration setting (Fig. 1,num. 20: Internal or external filtration is set or arranged as shown in fig. 1.) for the digital radiography imaging system (fig. 1 is a system.);

d) means (fig. 3,num. 320, label: "3-B: Read relevant data from calibration table" is part of a program in col. 8, lines 44,45 and 46.) for obtaining a default decomposition parameter (The "relevant data from calibration table" of fig. 3,num. 320, label: "3-B: Read relevant data from calibration table" is a default decomposition parameter. Note that fig. 3,num. 324, label: "3-B: Read relevant data from calibration table" is based on a decomposition as shown in fig. 3, label: "B: Material Decomposition.) based (via numerals 300,310 and 320) on energy levels of the low and high-energy images (Fig. 2, num.300: Obtain dual images at high and low energies is used as a basis for fig. 3,num. 320, label:"3-B: Read relevant data from calibration table".) *or alternatively*

means for obtaining a default decomposition parameter (Fig. 1, num. 70 is a means for obtaining a default decomposition parameter, "parameter Φ" in col. 6, line 48 in terms of a "display unit" in col. 6, line 54 as shown in fig. 1, num. 70 during a decomposition display process as shown in fig. 3, num. 320: "Material Decomposition" and fig. 3, num. 334: ..."Display"....) on energy levels of the low and high-energy images (fig. 3, num. 300: "Obtain dual images at high and low energies". Note that parameter Φ is a default parameter, because the default parameter, Φ, is "adjust[ed]" in col. 6, line 42 when an image is currently "observed" in col. 6, line 49 for one value of Φ and "disappear[s]" in col. 6, line 50 for another value of Φ where the value of Φ for a observed image is the default image when Φ is not adjusted.)

e) automatically producing a soft tissue decomposition parameter and a bone decomposition parameter (Fig. 3, num. 330, label: "3-B5: Use Equations 8 and 9 to obtain soft-tissue and or/bone/calcification images" contains parameters or variables for both bone and tissue as shown in equations 8 and 9 of column 9.) by modifying (Fig. 3, num. 332: "3-B4:Use least square fit to determine the equivalent Lucite and Aluminum thickness combination" modifies a thickness.) the default decomposition parameter (The "relevant data from calibration table" of fig. 3,num. 324, label: "3-B: Read relevant data from calibration table" is a default decomposition parameter. Note that the relevant data includes "thickness" in col. 7, line 63 that is modified to obtain the "equivalent thickness" in col. 8, lines 62,63 using fig. 3, num. 332: "3-B4: Use least square fit to determine the equivalent Lucite and Aluminum thickness combination".) based on the patient size ("thickness" in col. 7, line 63 corresponds to the size of a patient in col. 3, line 49.) and the filtration setting (The relevant data contains "filtration" in col. 7, line 64 data.)

or alternatively

automatically producing a soft tissue decomposition parameter and a bone decomposition parameter (Fig. 3 is a flow chart for a computer, which inherently performs the operations of fig. 3 as opposed to a person performing the operation of fig. 3, that provides "Φ_s and Φ_b [which] are...angles to obtain in fig. 3, num. 330, respectively, a soft tissue image and a bone...image (col. 9, lines 16-18)." Note that Φ_s and Φ_b are also "parameters Φ" in col. 6, line 42 for soft tissue and bone, respectively.) by modifying the default decomposition parameter (Fig. 3 is a flow chart for a computer, which inherently performs the operations of fig. 3, that provides "Φ_s and Φ_b [which] are...angles [or parameters] to obtain in fig. 3, num. 330, respectively, a soft tissue image and a bone...image (col. 9, lines 16-18)" by modifying the default decomposition parameter, "adjustable Φ parameters" in col. 6, line 42. Note that Φ regardless of the subscript is used during decomposition as shown in fig. 3, numerals 320: "B: Material Decomposition"; thus Φ is a decomposition parameter.) based on the patient size (Fig. 3 is a flow chart for a computer, which inherently performs the operations of fig. 3, that provides "Φ_s and Φ_b [which] are...angles [or parameters] to obtain in fig. 3, num. 330, respectively, a soft tissue image and a bone...image (col. 9, lines 16-18)" by modifying the default decomposition parameter, "adjustable Φ parameters" in col. 6, line 42, based on patient size or "thickness" in fig. 3, num. 328.)...

...and filtration setting (Fig. 3 is a flow chart for a computer, which inherently performs the operations of fig. 3, that provides "Φ_s and Φ_b [which] are...angles [or parameters] to obtain in fig. 3,num. 330, respectively, a soft tissue image and a bone...image (col. 9, lines 16-18)" by modifying the default decomposition parameter, "adjustable Φ parameters" in col. 6, line 42, based on patient size or "thickness" in fig. 3, num. 328 and filtration setting as performed in fig. 3, num. 300 and mentioned in the context "filters" in col. 7, line 10 and how the filters are set to "switch[ ]" in col. 7, line 11 to arrive at the above mentioned angles or "predefined...angles [or parameters, Φ_s and Φ_b] (col. 9, line 16).");

and

f) means (fig. 3,numerals 320,324,326,328,330 shown twice and 332 is part of a program in col. 8, lines 44,45 and 46.) for decomposing (fig. 3,numerals 320,324,326,328,330 shown twice and 332 are a series of decomposing processes.) soft tissue and bone images of the desired anatomy (Fig. 3,num. 310:"2: (conventional) Preprocessing of each image (e.g., gain correction)" are images of fig. 1, num. 50: Subject for Imaging that will be decomposed using fig. 3,numerals 320,324,326,328,330 shown twice and 332.) from the low and high-energy images (Fig. 3. num. 300:"1:Obtain dual images at high and low energies.) using the soft tissue and bone decomposition parameters (Fig. 3, num. 330, label:"3-B5: Use Equations 8 and 9 to obtain soft-tissue and or/bone/calcification images" contains parameters or variables for both bone and tissue as shown in equations 8 and 9 of column 9.)...

...to perform a log-subtraction dual-energy decomposition computation (Fig. 3, num. 330, label:"3-B5: Use Equations 8 and 9 to obtain soft-tissue and or /bone/calcification images" contains parameters or variables for both bone and tissue as shown in equations 8 and 9 of column 9. Note that fig. 3, num. 330 is part of a decomposition process that is based on log-subtraction as shown by equation (3) in column 5.).

Regarding claim 36, Zhao et al. discloses a computer program for automatically providing decomposition parameters for decomposing soft tissue and bone images from low and high-energy images acquired from a digital radiography imaging system, comprising:

a) a tangible medium configured to support machine-readable code (fig. 1,num. 40:" Computer(s)"); and

b) machine-readable code ("computer program" in col. 8, line 46) supported on the medium (fig. 1,num. 40:" Computer(s)") and including:

b1) a routine (fig. 3,num. 320, label:"3-B: Read relevant data from calibration table" is a part of the computer program.) for obtaining a default decomposition parameter (The "relevant data from calibration table" of fig. 3,num. 320, label:"3-B: Read relevant data from calibration table" is a default decomposition parameter. Note that fig. 3,num. 320, label:"3-B: Read relevant data from calibration table" is based on numerals 300 and 310.) on energy levels of the low and high-energy images (Fig. 2, num.300: Obtain dual images at high and low energies is used as a basis for fig. 3,num. 320, label:"3-B: Read relevant data from calibration table".); and

b2) a routine (Fig. 3, num. 330, label:"3-B5: Use Equations 8 and 9 to obtain soft-tissue and or/bone/calcification images" is a part of the computer program.) for automatically providing a soft tissue decomposition parameter and a bone decomposition parameter (Fig. 3, num. 330, label:"3-B5: Use Equations 8 and 9 to obtain soft-tissue and or/bone/calcification images" contains parameters or variables for both bone and tissue as shown in equations 8 and 9 of column 9.) by modifying (Fig. 3, num. 332: "3-B4:Use least square fit to determine the equivalent Lucite and Aluminum thickness combination") the default decomposition parameter (The "relevant data from calibration table" of fig. 3,num. 320, label:"3-B: Read relevant data from calibration table" is a default decomposition parameter. Note that the relevant data includes "thickness" in col. 7, line 63 that is modified to obtain the "equivalent thickness" in col. 8, lines 62,63 using fig. 3, num. 332: "3-B4:Use least square fit to determine the equivalent Lucite and Aluminum thickness combination".) based on the patient size("thickness" in col. 7, line 63 corresponds to the size of a patient in col. 3, line 49.) and the filtration setting (The relevant data contains "filtration" in col. 7, line 64 data.) of the digital radiography imaging system (fig. 1 is a system).

Claims 1 and 15 are rejected the same as claim 26. Thus, argument similar to that presented above for claim 26 is equally applicable to claims 1 and 15.

Regarding claims 31 and 40, Zhao et al. discloses the method of claim 26 and the computer program of claim 36, wherein the and routine (fig. 3,num. 320, label:"3-B: Read relevant data from calibration table" is a part of the computer program in col. 8, lines 43,44,46.) for obtaining the default decomposition parameter (The "relevant data from calibration table" of fig. 3,num. 324, label:"3-B: Read relevant data from calibration table" is a default decomposition parameter. Note that fig. 3,num. 324, label:"3-B: Read relevant data from calibration table" is based on a decomposition as shown in fig. 3, label: "B: Material Decomposition.) comprises:

a) a routine (fig. 3,num. 324, label:"3-B: Read [or selecting] relevant data from calibration table" is part of the computer program.) for selecting the default decomposition parameter from a parameter table (The "relevant data from calibration table" of fig. 3,num. 324, label:"3-B: Read [or selecting] relevant data from calibration table" is a default decomposition parameter.) comprising a plurality of default decomposition parameters (col. 7, lines 60-67 lists parameters contained in the table 324 of fig. 3.), each corresponding to a low-energy level ("low...energies" in col. 7, lines 65,66) of the first energy image (Fig. 3. num. 300:"1:Obtain dual images at high and low energies.) and to a high-energy level ("high energies" in col. 7, lines 65,66) of the second energy image (Fig. 3. num. 300:"1:Obtain dual images at high and low energies.).

Regarding claim 32, Zhao et al. discloses the method of claim 26, comprising:

a) an image enhancement routine/means for interactively (Fig. 3,num. 330 is part of the computer program in col. 8, lines 44,45 and 46.) for modifying at least one parameter ("parameter N" in col. 6, line 48 is modified with math operations in equations (5) or (8) or (9).) of the soft tissue and bone decomposition parameters (Fig. 3, num. 330, label:"3-B5: Use Equations 8 and 9 to obtain soft-tissue and or/bone/calcification images" contains parameters or variables for both bone and tissue as shown in equations 8 and 9 of column 9.) to improve image clarity ("producing a desired anatomy" in col. 6, lines 50,51.) of at least one image of the soft tissue ("producing a desired anatomy (soft tissue) image" in col. 6, lines 50,51.) and bone images interactively ("producing a desired anatomy (soft tissue) image" in col. 6, lines 50,51 can be "displayed" in col. 6, line 54.); and

b) a system update routine/means (Fig. 3,num. 330 is part of the computer program in col. 8, lines 44,45 and 46.) for automatically modifying (Equation (8) automatically modifies since it includes match operations that modify.) at least one system default (The "relevant data from calibration table" of fig. 3,num. 324, label:"3-B: Read relevant data from calibration table" is a default decomposition parameter. Note that the relevant data includes "thickness" in col. 7, line 63 also shown as "$(Lucite)_i$ " in equation (8) of column 9 that is modified with "b_i".) based on modifications ("parameter N" is modified with math operations in equations (5) or (8) or (9).) to the at least one parameter ("parameter N" in col. 6, line 48)

or alternatively

a) an image enhancement routine/means (Fig. 3,num. 330 is part of the computer program in col. 8, lines 44,45 and 46.) for interactively modifying at least one parameter (The variable "Φ" in equations 8 and 9 are modified during "rotation in a material base" in col. 9, line 6.) of the soft tissue and bone decomposition parameters (The variable "Φ" in equations 8 and 9 are modified during "rotation in a material base" in col. 9, line 6 of the soft tissue and bone decomposition parameters, Φ_s and Φ_b, respectively.) to improve image clarity of at least one image of the soft tissue and bone images (The variable "Φ" in equations 8 and 9 are modified during "rotation in a material base" in col. 9, line 6 of the soft tissue and bone decomposition parameters, Φ_s and Φ_b, respectively, to improve image clarity of at least one image of the soft tissue or "soft tissue" in col. 6, line 51 and col. 9, line 18 that appears when a "background...disappear[s] (col. 6, lines 49,50).") interactively (The variable "Φ" in equations 8 and 9 are modified during "rotation in a material base" in col. 9, line 6 of the soft tissue and bone decomposition parameters, Φ_s and Φ_b, respectively, to improve image clarity of at least one image of the soft tissue or "soft tissue" in col. 6, line 51 and col. 9, line 18 that appears when a "background...disappear[s] (col. 6, lines 49,50)" interactively since the soft tissue is "desired" in col. 6, line 50 and is inherently "observed" in col. 6, line 49 where the words desired and observed are interpreted in the context of a user.); and

b) a system update routine/means (Fig. 3, num. 334 is part of a computer program or routine or means that displays a function "$A_i(\Phi)$" in col. 6, line 53 which is updated.) for automatically modifying at least one system default (The function $A_i(\Phi)$ is a system default because it corresponds to an "obtain[ing]" in col. 6, line 44 operation where one image is considered the default when a new image is not obtained and is automatically modified based on Φ.) based on modifications to the at least one parameter (The function $A_i(\Phi)$ is a system default because it corresponds to an "obtain[ing]" in col. 6, line 44 operation where one image is considered the default when a new image is not obtained and is automatically modified based on modifications to the at least one parameter, Φ where Φ is rotated to either Φ_s and Φ_b in the above mentioned material base which is a 2-D vector space where a vector is rotated at predetermined angles.).

Regarding claim 33, Zhao et al. discloses the method of claim 32, wherein modifying at least one parameter ("parameter N" in col. 6, line 48 is modified with math operations in equations (5) or (8) or (9).) comprises:

a) interactively improving ("displayed" in col. 6, line 54 produces a "desired... image" in col. 6, lines 50,51.) the at least one image ("producing a desired anatomy (soft tissue) image" in col. 6, lines 50,51.) by modifying the at least one parameter ("parameter N" in col. 6, line 48 is modified with math operations in equations (5) or (8) or (9).) using a sliding scale ("angles" in col. 9, line 16 contains a plurality of angles which makes a scale for selecting an angle or parameter "N".).

Regarding claim 45, Zhao et al. discloses a medical imaging system, comprising:

a) a digital radiographic imaging system, comprising:

a1) an x-ray device (fig. 1,num. 10: Dual Energy X-ray Tube Generator) adapted to generate x-rays (fig. 1, label: X-rays);

a2) a collimator (fig. 1,num. 20: Internal or external filtration) adapted to filter the x-rays (Fig. 1: X-rays) in a desired anatomical region of a patient (Fig. 1,num. 50: Subject for Imaging);

a3) a flat-panel digital x-ray detector (fig. 1,num. 30: Pixelated Digital x-ray detector) adapted to detect x-rays passing through the patient (Fig. 1,num. 50: Subject for Imaging); and

a4) dual-energy control circuitry adapted to acquire low and high-energy images of the desired anatomical region(fig. 1,num. 30: Pixelated Digital x-ray detector and fig. 1,num. 40: Computer(s) "acquire dual energy...images of a subject 50...(col. 3, lines 7-9).") over a time interval ("rapid succession" in col. 3, line 13); and

b) an image processing system (fig. 1,num. 40: Computer(s)), comprising:

b1) an automatic decomposition parameter selection module (Fig. 3, num. 330, label:"3-B5: Use Equations 8 and 9 to obtain soft-tissue and or/bone/calcification images" is a part of the computer program.) adapted to compute soft tissue and bone decomposition parameters (Fig. 3, num. 330, label:"3-B5: Use Equations 8 and 9 to obtain soft-tissue and or/bone/calcification images" computes decomposition parameters using equations.) by modifying (Fig. 3, num. 332: "3-B4:Use least square fit to determine the equivalent Lucite and Aluminum thickness combination") the default decomposition parameter (The "relevant data from calibration table" of fig. 3,num. 320, label:"3-B: Read relevant data from calibration table" is a default decomposition parameter. Note that the relevant data includes "thickness" in col. 7, line 63 that is modified to obtain the "equivalent thickness" in col. 8, lines 62,63 using fig. 3, num. 332: "3-B4:Use least square fit to determine the equivalent Lucite and Aluminum thickness combination".) based on the patient size ("thickness" in col. 7, line 63 corresponds to the size of a patient in col. 3, line 49.) and the filtration setting (The relevant data contains "filtration" in col. 7, line 64 data.) of the collimator (fig. 1, num .20: Internal or external filtration); and

b2) a dual-energy image decomposition module (fig. 3,numerals 320,324,326,328,330 shown twice,332 is a module.) adapted to decompose (fig. 3,numerals 320,324,326,328,330 shown twice,332 is a series of decomposing processes.) soft tissue and bone images of the desired anatomy (Fig. 3,num. 310:"2: (conventional) Preprocessing of each image (e.g., gain correction)" are images of fig. 1, num. 50: Subject for Imaging.) from the low and high-energy images (Fig. 3. num. 300:"1:Obtain dual images at high and low energies.) using the soft tissue and bone decomposition parameters (Fig. 3, num. 330, label:"3-B5: Use Equations 8 and 9 to obtain soft-tissue and or/bone/calcification images" contains parameters or variables for both bone and tissue as shown in equations 8 and 9 of column 9.).

Regarding claim 48, Zhao et al. discloses a system for decomposing soft tissue and bone images from low and high-energy images acquired by a digital radiography imaging system, comprising:

a) means (Fig. 3, num. 330, label:"3-B5: Use Equations 8 and 9 to obtain soft-tissue and or/bone/calcification images".) for automatically providing a soft tissue decomposition parameter and a bone decomposition parameter (Fig. 3, num. 330, label:"3-B5: Use Equations 8 and 9 to obtain soft-tissue and or/bone/calcification images" computes decomposition parameters using equations that have parameters.) based on a default decomposition parameter (The "relevant data from calibration table" of fig. 3,num. 320, label:"3-B: Read relevant data from calibration table" is a default decomposition parameter. Note that fig. 3,num. 320, label:"3-B: Read relevant data from calibration table" is based on a decomposition as shown in fig. 3, label: "B: Material Decomposition.), a patient size ("thickness" in col. 7, line 63 corresponds to the size of a patient in col. 3, line 49.) and a collimator filtration setting (The relevant data contains "filtration" in col. 7, line 64 data.).

Regarding claims 28,37 and 49, Zhao et al. discloses the method of claim 26 and routine of claim 37 and the system of claim 48, wherein identifying the patient size ("patient size" in col. 3, line 49, col. 4, lines 65,66 and "size of the object" in col. 5, line 8) comprises [the] **an** act of and a routine/means (Fig. 3,num. 324 in col. 7, line 59 is part of a computer program in col. 8, lines 43,44,46.) for identifying("correlate[ing]") in col. 7, line 62) a size category ("maximum thickness" in col. 8, line 8 or "thickness" in col. 8, line 10 is determined based on a "subject" in col. 8, line 10.) for the patient.

Regarding claims 29 and 38, Zhao et al. discloses the method of claim 28 and the computer program of claim **37**, wherein identifying the patient size ("patient size" in col. 3, line 49, col. 4, lines 65,66 and "size of the object" in col. 5, line 8) comprises [the] **an** act of and a routine (Fig. 3,num. 324 in col. 7, line 59 is part of a computer program in col. 8, lines 43,44,46.) for selecting ("final selection" in col. 8, line 9) a patient size offset factor ("fine steps" in col. 8, line 2) based on the size category ("maximum thickness" in col. 8, line 8 or "thickness" in col. 8, line 10 is determined based on a "subject" in col. 8, line 1039 .).

Regarding claims 30,and 50, Zhao et al. discloses the method of claim 26 and the computer program of claim 36 and the system of claim 48, wherein identifying the filtration setting (Fig. 1,num. 20: Internal or external filtration is set or arranged as shown in fig. 1.) comprises:

a) routine/means (Fig. 3,num. 324 in col. 7, line 59 is part of a computer program in col. 8, lines 43,44,46.) for selecting a filtration offset factor ("fine steps" in col. 8, line 2 is based on a "thickness range" in col. 4, line 65 "which is selected, for each filter...(col. 4, lines 64,65)." Thus the fine steps are selected for each filter of fig. 1.) based on the filtration setting (Fig. 1,num. 20: Internal or external filtration is set or arranged as shown in fig. 1.)

or alternatively

Regarding claims 30,and 50, Zhao et al. discloses the method of claim 26 and the computer program of claim 36 and the system of claim 48, wherein identifying the filtration setting (Fig. 1,num. 20: Internal or external filtration is set or arranged as shown in fig. 1.) comprises:

a) routine/means (Fig. 3,num. 324 is a computer program in col. 8, lines 43,44,46.) for selecting a filtration offset factor (Fig. 3,num. 324 is a computer program in col. 8, lines 43,44,46 for selecting a filtration offset factor or "thickness range which is selected" in col. 4, lines 64,65.) based on the filtration setting (Fig. 3,num. 324 is a computer program in col. 8, lines 43,44,46 for selecting a filtration offset factor or "thickness range which is selected" in col. 4, lines 64,65 based on the filtration setting or "switch[ing]" in col. 4, line 57 operation that sets or initiates a filter during the switching operation between two filters. Note that the thickness range is the claimed filtration offset factor, because the selected thickness range is "appropriate...for each filter" in col. 4, lines 64,65 which in turn "improve[s]...image quality (col. 4, line 59)", and corresponds to the specification on page 19, lines 8,9 which states that "filtration offsets facilitate the selection... of an optimal filtration..."; hence, a range or the claimed filtration offset of a filter is selected which results in an improved image or the above mentioned optimal filtration which inherently generates the improved image.).

Regarding claim 2, Zhao et al. discloses the method of claim 1, wherein the act of identifying the energy levels (Fig. 3. num. 300:"1:Obtain dual images at high and low energies.) comprises:

a) identifying (Fig. 1, num. 30 is a detector "take[s]" in col. 6, line 9 or identifies "high and low... images" in col. 6, line 8.) a low-energy level for the first energy image (Fig. 3. num. 300 obtains an image at a high energy.); and

b) identifying (Fig. 1, num. 30 is a detector "take[s]" in col. 6, line 9 or identifies "high and low... images" in col. 6, line 8.) a high-energy level for the second energy image (Fig. 3. num. 300 obtains an image at a low energy.).

Claims 3 and 18 are rejected the same as claim 28. Thus, argument similar to that presented above for claim 28 is equally applicable to claims 3 and 18.

Claims 4 and 19 are rejected the same as claim 29. Thus, argument similar to that presented above for claim 29 is equally applicable to claims 4 and 19.

Claims 5 and 20 are rejected the same as claim 30. Thus, argument similar to that presented above for claim 30 is equally applicable to claims 5 and 20.

Claims 6 and 21 are rejected the same as claim 31. Thus, argument similar to that presented above for claim 31 is equally applicable to claims 6 and 21.

Regarding claim 7, Zhao et al. discloses the method of claim 1, comprising:

a) evaluating the energy levels against energy range restrictions as mentioned in col. 3, lines 25-31.

Regarding claim 8, Zhao et al. discloses the method of claim 7, wherein automatically providing the soft tissue and bone decomposition parameters (Fig. 3, num. 330, label:"3-B5: Use Equations 8 and 9 to obtain soft-tissue and or/bone/calcification images" contains parameters or variables for both bone and tissue as shown in equations 8 and 9 of column 9.) is performed only (A safety feature in col. 4, lines 3-5 restricts the range as mentioned in col. 3, lines 25-31.Thus, if the safety feature was not used the device of fig. 1 is unsafe for performing operations.) if the energy levels (Fig. 3. num. 300:"1:Obtain dual images at high and low energies.) are within the energy range restrictions as mentioned in col. 3, lines 25-31.

Regarding claims 9 and 41, Zhao et al. discloses the method of claim 1 and the computer program of claim 36, comprising:

a) a decomposition routine (fig. 3,numerals 320,324,326,328,330 shown twice and 332 are a series of decomposing processes that is part of the computer program in col. 8, lines 44,45 and 46.) for decomposing (fig. 3,numerals 320,324,326,328,330 shown twice and 332 are a series of decomposing processes.) soft tissue and bone images (fig. 3,num. 300 contains images of soft tissue and bones.) based on the soft tissue and bone decomposition parameters (Fig. 3, num. 330, label:"3-B5: Use Equations 8 and 9 to obtain soft-tissue and or/bone/calcification images" contains parameters or variables for both bone and tissue as shown in equations 8 and 9 of column 9.); and

The remaining limitations were addressed in claim 32.

Claim 22 is rejected the same as claim 32. Thus, argument similar to that presented above for claim 32 is equally applicable to claim 22.

Claims 10 and 23 are rejected the same as claim 33. Thus, argument similar to that presented above for claim 33 is equally applicable to claims 10 and 23.

Regarding claims 35 and 44, Zhao et al. discloses the method of claim 32 and the computer program of claim 41, wherein automatically modifying (Equation (8) automatically modifies since it includes match operations that modify.) the at least one system default (The "relevant data from calibration table" of fig. 3,num. 324, label:"3-B: Read relevant data from calibration table" is a default decomposition parameter. Note that the relevant data includes "thickness" in col. 7, line 63 also shown as "$(Lucite)_i$ " in equation (8) of column 9 that is modified with "b_i".) and the system update routine (Fig. 3,num. 330 is part of the computer program in col. 8, lines 44,45 and 46.) comprises:

a) a default parameter modification routine ("search/fit algorithm") for modifying ("interpolating" in col. 6, line 26) a default decomposition parameter table (Parameters of the "table" of fig. 3,num. 320 are interpolated in col. 6, lines 23-25.) for the default decomposition parameter (The "relevant data from calibration table" of fig. 3,num. 320, label:"3-B: Read relevant data from calibration table" is a default decomposition parameter. Note that fig. 3,num. 324, label:"3-B: Read relevant data from calibration table" is based on a decomposition as shown in fig. 3, label: "B: Material Decomposition.).

Claims 34 and 43 is rejected the same as claims 35 and 44, respectively. Thus, argument similar to that presented above for claims 35 and 44 is equally applicable to claims 34 and 43.

Claims 11 and 24 are rejected the same as claim 34. Thus, argument similar to that presented above for claim 34 is equally applicable to claims 11 and 24.

Claims 12 and 25 are rejected the same as claim 35. Thus, argument similar to that presented above for claim 35 is equally applicable to claims 12 and 25.

Claim 13 is rejected the same as claim 29. Thus, argument similar to that presented above for claim 29 is equally applicable to claim 13.

Claim 14 is rejected the same as claim 30. Thus, argument similar to that presented above for claim 30 is equally applicable to claim 14.

Regarding claim 27, Zhao et al. discloses the method of claim 26, wherein acquiring the low and high-energy images (Fig. 3. num. 300:"1:Obtain dual images at high and low energies.) of the desired anatomy (Fig. 1, num. 50: Subject for Imaging) comprises:

a) acquiring low and high-energy chest images (Figs. 5A,5B,6A and 6B are chest images) over a time interval ("sufficient time" in col. 7, line 5).

Claim 16 is rejected the same as claim 27. Thus, argument similar to that presented above for claim 27 is equally applicable to claim 16.

Regarding claim 17, Zhao et al. discloses the method of claim 15, wherein obtaining the default decomposition parameter comprises:

a) identifying a low-energy level for the first energy image (as mentioned in col. 3, lines 25-31);

b) identifying a high-energy level for the second energy image (as mentioned in col. 3, lines 25-31); and

c) selecting ("final selection" in col. 8, line 9) the default decomposition parameter (The final selection corresponds to the "relevant data from calibration table" of fig. 3,num. 320, label:"3-B: Read relevant data from calibration table" is a default decomposition parameter. Note that fig. 3,num. 324, label:"3-B: Read relevant data from calibration table" is based on a decomposition as shown in fig. 3, label: "B: Material Decomposition.) based on both the low and high-energy levels (as mentioned in col. 3, lines 25-31 and in col. 7, lines 65,66.).

Regarding claim 42, Zhao et al. discloses the computer program of claim 41, wherein the image enhancement routine (Fig. 3,num. 330 is part of the computer program in col. 8, lines 44,45 and 46.) comprises an interactive slider mechanism (fig. 1,num. 70: Display unit allows viewing of images that can be modified.) adapted to interactively improve the at least one image ("producing a desired anatomy (soft tissue) image" in col. 6, lines 50,51.) by re-decomposing ("recombining" in col. 9, line 3 of decomposed images.) the at least one image ("(soft tissue) image" in col. 6, lines 50,51.) using the modified at least one parameter ("parameter N" in col. 6, line 48 is modified with math operations in equations (5) or (8) or (9) is used to modify images using the display unit 70 of fig. 1.).

Claim 46 is rejected the same as claim 41. Thus, argument similar to that presented above for claim 41 is equally applicable to claim 46.

Claim 47 is rejected the same as claim 44. Thus, argument similar to that presented above for claim 44 is equally applicable to claim 47.

Claim 51 is rejected the same as claim 26, paragraph d. Thus, argument similar to that presented above for claim 26, paragraph d is equally applicable to claim 51.

Claim 52 is rejected the same as claim 26, paragraph f. Thus, argument similar to that presented above for claim 26, paragraph f is equally applicable to claim 52.

Claim 53 is rejected the same as claim 26, paragraph a. Thus, argument similar to that presented above for claim 26, paragraph a is equally applicable to claim 53.

Claim 54 is rejected the same as claim 32, paragraph a. Thus, argument similar to that presented above for claim 26, paragraph a is equally applicable to claim 54.

Claim 55 is rejected the same as claim 32, paragraph b. Thus, argument similar to that presented above for claim 32, paragraph b is equally applicable to claim 55.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Rosario whose telephone number is (571) 272-7397. The examiner can normally be reached on 6-3.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on (571) 272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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